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OPERATION PEP--A STATE-WIDE PROJECT TO PREPARE EDUCATIONAL PLANNERS FOR CALIFORNIA.

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OPERATION PEP REPRESENTS A DESIGNFUL ATTEMPT ON THE PART OF THE EDUCATIONAL COMMUNITY IN CALIFORNIA TO PLAN, DESIGN, AND IMPLEMENT A TRAINING PROGRAM FOR THE EDUCATIONAL PLANNERS AND MANAGERS. THE BASIC CONTENT OF INSTRUCTION WILL BE DERIVED THROUGH THE ADAPTIVE TRANSLATION OF SCIENTIFIC AND INDUSTRIAL MANAGEMENT TECHNOLOGY TO THE CONTEXT OF EDUCATION. THIS PAPER ATTEMPTS TO EXPLAIN SOME OF THE COMPONENT PARTS AND BACKGROUND OF OPERATION PEP--(1) THE PHILOSOPHY, (2) THE AREAS OF TECHNOLOGY TO BE ANALYZED AND EVALUATED DURING 1967-68, (3) THE LONG-RANGE GOALS, (4) THE TYPE OF INSTRUCTIONAL ATMOSPHERE TO BE MAINTAINED, AND (6) THE BASIC FEATURES OF THE INSTRUCTIONAL STRATEGY. (HW)

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Prepared by:

The Staff of OPERATION PEP

OPERATION PEP

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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OPERATION PEP: A STATE-WIDE PROJECT TO PREPARE EDUCATIONAL PLANNERS FOR CALIFORNIA

by

Donald R. Miller, Project Director

November 7, 1967

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OPERATION PEP: A State-wide Project to
Prepare Educational Planners for California

1. What is OPERATION PEP?

2. What is the philosophy of OPERATION PEP?

3. What are the long-range goals of OPERATION PEP?

4. What areas of technology are to be analyzed and evaluated during 1967-68?

5. What type of instructional atmosphere will be maintained?

6. What are the basic features of the instructional strategy?

WHAT IS OPERATION PEP?

OPERATION PEP is designed as a state-wide project to prepare educational planners for California. The project represents a deliberate attempt, on the part of the educational community in California, to plan, design and implement a training program for educational planners and managers. The basic content of instruction will be derived through the adaptive translation of scientific and industrial management technology to the context of education.

The adaptive translation will be performed using a task force approach. The task force will consist of representative participants, OPERATION PEP staff members and professional consultants. Twelve areas have been identified as being relevant for evaluation by the task force. These areas will be analyzed and evaluated during the 1967-68 program year.

OPERATION PEP is funded by a United States Office of Education grant award under Title III of the Elementary and Secondary Education Act of 1965 (P.L. 89-10). The planning phase of OPERATION PEP (January 28, 1966 through June 30, 1967) was administered by the Office of the Tulare County Superintendent of Schools. The operational phase of the project (July 1, 1967 to date) was transferred to the Office of the San Mateo County Superintendent of Schools. Dr. J. Russell Kent serves as chairman of the project's executive board. The project will continue under the direction of Donald R. Miller in its new location at 1870 El Camino Real, Burlingame, California (94010).

WHAT IS THE PHILOSOPHY OF OPERATION PEP?

The educational planning and management training program featured in OPERATION PEP possesses a philosophy based upon scientific principles and methods. Each principle and method can be identified as supportive of the project's principal focus to enhance the human resources in the educational system and its environment. The following basic assumptions constitute the project's philosophy:

1. The essential characteristic of human resources resides in the dignity and worth of the individual.

2. Human resources constitute the vital elements of both the educational system and its environment.

3. The quality and quantity of available human resources is always relative to time, space and energy conditions.

4. Human resources can always be characterized by dynamic growth and evolution toward desired goals.

5. Human resources in the environment and the system interact at and between each functional level of performance.

6. The primary purpose of the environment and, therefore, the system is to enhance the value of its human resources.

Realizing the tentative nature of knowledge and the rapid rate of decay which can be associated with technical knowledge retention, the instructional program of OPERATION PEP will feature a final design based upon an integrated framework of relevant concepts and principles. Concepts and principles tend to remain fairly stable over longer periods of time than does factual information.

In addition, principles are usually generic in that they relate to or are characteristic of a whole group of specific

premises. The principles desired for the OPERATION PEP training program should also offer heuristic benefits by serving as guides for planning and management activities. Principles achieve the status of fundamental assumptions when they are well supported by evidence. Hence, their primary value resides in their explanatory potential. Principles always possess greater generality than any of their related premises and are of considerable importance because they contribute to the achievement of an inclusive system of explanation.

The anticipated skills, knowledges and competencies to be derived through training are subordinate to the planning and management principles which make up the design framework for the instructional program.

WHAT ARE THE LONG-RANGE GOALS OF OPERATION PEP?

The long-range goals of OPERATION PEP represent the foresighted dreams of many responsible educators in California. In addition, the goals have historical antecedents which stimulated and, finally, predicated the requirements which the project attempts to satisfy. The following long-range goals are relevant:

1. The planning, designing and implementation of validated training programs for educational planners and managers based upon professional role requirements.

2. The establishment of a self-replicating capacity and capability, within the educational community of California, to provide continuously for instruction and to up-date instructional materials.

3. The state-wide adoption of a system approach to educational planning and management.

The expressed long-range goals are in the interest of the children of California and are imperative in order that today's educators might be provided the opportunity to begin planning, developing and implementing those programs of planned educational change which will effectively serve tomorrow's children.

WHAT AREAS OF TECHNOLOGY ARE TO BE ANALYZED AND EVALUATED DURING 1967-68?

The OPERATION PEP training program will explore the selected areas of educational planning and management. The program is designed to familiarize participants with scientific and management technology which has been validated in other areas of planning and management. The following instructional units are contemplated:

1. Orientation to OPERATION PEP.
2. Design and Assessment Structures.
3. System Analysis and System Synthesis.
4. Management and Control Sub-systems.
5. Network-based Management Sub-systems.
6. Planning Programing Budgeting Sub-systems
7. Cost-benefit and Cost-effectiveness Analysis.
8. Environmental Analysis and Need Assessment.
9. Technical Procedures in Educational Planning.
10. Planned Change in Education.
11. Management Information Handling.
12. Modeling and Simulation.

Orientation to OPERATION PEP

The orientation unit for the instructional program of OPERATION PEP seeks to provide information relative to the instructional program. In addition, the orientation unit has been designed to present an overview of the project. The orientation unit has been separated into three sections:

1. OPERATION PEP: A State-wide Project to Prepare Educational Planners for California.

2. Design Considerations for the Instructional Program of OPERATION PEP.

3. A System Approach for Solving Educational Problems.

The first section attempts to answer relevant questions regarding OPERATION PEP as a project. The second section provides participants with an insight into how the project has been designed as a controlled investigation. The third section introduces participants to an overview of a system approach to educational problem-solving and decision-making.

Design and Assessment Structure

Without an all-encompassing theoretical design, comprehensive planning for education tends to be segmented, uncoordinated, and characterized by inefficiency. Obtaining the maximum forward thrust from performance in an educational system demands an all-embracing design and means of assessment. With an adequate theoretical design, the diverse activities of all facets and levels of education may be smoothly integrated into a long-range, comprehensive unity of effort and production.

The Gross Product of Education (GPE) provides a design for educational planning. It is rooted in the concept of the dignity and worth of the individual and can best be understood as a measure of the developed human resources of a given area. The use of the GPE affords an assessment structure that allows a periodic determination of educational progress and permits an objective

evaluation of proposed innovations and assumed improvements.

System Analysis and System Synthesis

Eckman has revealed keen insight into the study of systems when he prefaced the work, Systems: Research and Design, with the following statements:

> "The study of systems must be characterized by objectivity, that is, the analysis and synthesis must be directed toward the ultimate utility or purpose of the system to man. This automatically implies an ultimate sociological objective and further implies that the ultimate system embraces the universe. It is obvious that any real systems study can only encompass a portion of the ultimate system, and, therefore, that every system being studied is but a portion of a larger system. This, in turn, causes almost all systems studied to be directed toward an intermediate objective, such as an economic value, political worth, purely technical performance, or some understandable combination of these. The role of the environment of a system, which is everything outside the system under study, is exceedingly important in the influence on the behavior of the system itself.
>
> The complete accomplishment of the study of any problem involves three specific and well-defined but interrelated tasks: (1) The systems analysis is directed toward an over-all objective, must be related to environment, and will involve analysis, modeling, communication, control, optimization, and evaluation. (2) The design synthesis must achieve the various directed objectives, should be introspective in order to evaluate physical realizability, and must be based upon practical knowledge of the physical world. (3) The scientific study provides a behavioral and phenomenological base for the various activities of design and, ultimately, therefore, systems analysis. The interplay of these three disciplines must be promoted to the greatest extent because without this interplay no systems study will be successful. Systems analysis leads to the directed objectives of design, which, in turn, must call upon the various sciences for better understanding; thence returning through the interplay from scientific phenomena to the design synthesis to the systems re-evaluation." [1]

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[1]Donald P. Eckman (ed.), Systems: Research and Design (New York: John Wiley & Sons, Inc., 1961), p. ix-x.

A system approach to educational endeavors would consider every element in any environment related to a definitive problem. Analysis and synthesis are applied systematically to the problem. First, analysis is used to break down the entire problem by identifying, relating, separating, limiting, etc., all the elements. Once analysis is complete, synthesis can begin and by combining, reorganizing, creating new configurations, modifying, etc., new patterns from the problem's elements are possible. A system approach utilizes, therefore, the planning continuum--analysis--synthesis--modification--analysis--synthesis--modifications.

Management and Control Sub-systems

Management is a scientific operation designed to plan, coordinate, direct, control, organize and allocate resources against performance requirements within the scope of basic policies established and the pattern of authority delegated by the policy-making structure of the system. Management performs an adaptive system function by planning and controlling changes in the actions, patterns and structures of the system.

Successful performance of functions depends upon the quality and quantity of the system inputs available and adherance to four functional imperatives; namely, pattern maintenance, goal-attainment, integration and adaptation.

The management training program of OPERATION PEP focuses upon conceptual schemes and skill development which will enable managers to analyze new and/or unfamiliar technical information

and methods. In addition, the training program will help managers develop an inquiry process which enables them to ask those questions about any problem which will produce the relevant and reliable information desired. This inquiry process will facilitate inquiry into the nature of the problem (what is wrong?), the cause of the problem (what made it go wrong?), the possible courses of action (what can we do about it?) and anticipate the consequences of such actions (what might happen if we do this?) before making decisions.

Network-Based Management Sub-System

A network-based management sub-system features the use of network planning and control concepts. These concepts have been used to develop PERT (Program Evaluation and Review Technique) and CPM (Critical Path Method). Both processes use a network approach to develop and diagram problems. They can be best understood as a set of principles, methods and techniques for the effective planning of objective-oriented work and, thereby, establishing sound bases for effective scheduling, costing, controlling and revising management programs.

Several benefits to be derived through use of the approach are implied in the following quotation:

> "The network approach to action planning is a major advance in improving management planning and control effectiveness and is designed specifically to deal with the accelerated pace of today's development programs and the uncertainties associated with them. The decision-making process has come to require increasing amounts of qualitative and quantitative data, with the result that the need for new aids to

> sound decision-making has been recognized. No management tool can make decisions, but tools such as network planning can provide the basis on which to build a realistic, economical management information system which will permit more informed decisions to be made."[2]

Planning Programing Budgeting System (PPBS)

Planning Programing Budgeting System (PPBS) is a concept for the comprehensive goal-directed management of a school system or institution. The individual components of the system are derived from the fields of budgeting, planning, management and related fields. In its essence, it is an orderly decision-making structure based upon those logical interrelationships which exist between goals, policies, resources, expenditures, operations and actions.

PPBS was designed as a management decision-making tool that could be used on problems related to the allocation of limited resources among alternative methods and strategies to obtain specified objectives. Its primary strength rests in its ability to provide decision-makers with information relative to the implications, the costs and the benefits of each alternative method and/or strategy. PPBS can be used in the evaluation and formulation of policy which, in turn, controls the allocation of resources.

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[2]Russell D. Archibald and Richard L. Villoria, Network-Based Management Systems (PERT/CPM), (New York: John Wiley and Sons, Inc., 1967), p. ix.

Cost-Benefit and Cost-Effectiveness Analysis

Cost-Benefit Analysis is a generalized and logical process for determining the expenditures of effort made to achieve an objective and/or product. It is a management tool which provides a framework of analysis enabling the decision-maker to select with confidence between programs competing for funds. Its criteria for judgment are based on the benefits vs. cost of several alternative approaches. It can thus be thought of as a kind of cost-effectiveness evaluation.

Cost-Effectiveness Analysis is based upon two separate analyses; first, the analysis of capabilities, methods and means by which functions are executed within a given context in accordance with predetermined standards (in essence, this is a determination of product performance effectiveness); second, the analysis of the expenditure of effort (cost) required to develop the performance product. The results of these analyses can be compared using a common function or a series of functions. The costs can be related to performance effectiveness using a system of criteria.

Environmental Analysis and Need Assessment

Environmental Analysis is a generalized and logical process for identifying and breaking down, into as many carefully distinguishable parts as possible, all of the external circumstances and conditions which affect an organism and/or a system at any stage of its existence. The process seeks to determine how these

parts are related to each other within the characteristic actions, patterns, and structures of the whole.

In educational planning, this entails a long-range forecast of the elements and forces of society and the culture which will impinge upon or tend to mold the character of the educational system of the future.

Need Assessment refers to the process of determining the relative importance, dimension and value of a discrepancy which exists between "what is" and "what is required" in light of the present state of knowledge and performance capability.

There are existing as well as emerging "unmet needs" that must be brought into consideration by educational planning. Identifying and documenting the extent of present and projected needs to be met by education are techniques used in planning that require special methods and skills.

Technical Procedures in Educational Planning

A technical procedure is a "system of organized performance functions based on scientific methods and techniques" which can be followed to achieve a specified objective. Specifically, this unit will present several alternative procedures which have produced reliable results. Among these are new techniques for preparing project proposals, developing plans of action, achieving communication effectiveness, structuring master plans, preparing program reports, etc.

Planning is a sequence of procedures designed to translate

organizational purposes into plans of action. These plans of action must be verified in full light of performance conditions before they can be used as a strategy. A strategy must be validated before it can be reliably used as a performance procedure. Several technical procedures will be introduced for possible use in quality control, verification and validation processes.

Planned Change in Education

One of the primary emphases of this project is focused upon the need for change in our educational practices. The basic problems to be faced in programs of planned change in educational practices are firmly rooted in the cultural setting of American schools. Scientific and technological changes have occurred at a more rapid rate than have changes in the behavioral sciences. The guiding questions from the cultural setting which pose many problems and implications for educational planners and designers of programs of change include:

1. In what kind of a world will the children live?
2. What "knowing" and "doing" skills will be needed for effective citizenship in that world?
3. Which of these skills are the responsibilities of public education?
4. What instructional programs are necessary to produce these skills?
5. What factors must be considered in order to implement effectively the necessary instructional programs under school circumstances which are ordinary, unenriched and normal?[3]

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[3]Cooperatively developed with Dr. Donald W. Johnson, California State Department of Education.

Management Information Handling

Computer-aided information systems are becoming a frequent adjunct to top-level management decision-making in education. These information systems are annually becoming more complex in terms of the types of tasks they can undertake and the range of technology they can encompass. Many school administrators find it difficult to keep abreast of these trends. However, as computer-aided information systems continue to influence more and more aspects of the management and control elements of school administration, educators must not only understand the new technology, but must also comprehend its implications in terms of the changing educational environment. The forward-looking school administrator must be able to envision new applications of this computer technology that will enhance the overall performance of this administration.

Significant improvements in computer hardware can be expected in the not too distant future. Computers will become smaller, less expensive and more reliable. Memory capacities will be increased. The input-output cycle will be decreased, and the school administrator will be able to have computer control and delivery systems available on his desk. OPERATION PEP will provide information relative to the design and implementation of a management information handling process.

Modeling and Simulation

A model can be defined as a deliberately simplified replica of a component of the real world into which one can feed relevant inputs and out of which one receives guidance for some problem-solving or decision-making activity. Model building skills need to be developed and utilized in order that educational decision-makers can take advantage of the informational benefits of models. Thus, a model can be regarded as a logical idealization of a real-world problem.

Simulation, on the other hand, is an operations research "...process of representing, without using formal analytic techniques, the essential features of a system or organization and analyzing its behavior by operating with the representation... Its outstanding virtue is that it can be used to tackle seemingly unmanageable or previously untouched problems where a traditional analytic formulation appears infeasible."[4]

Both modeling and simulation can be utilized without disturbing the existing functional state of the system being studied. In addition, both offer heuristic benefits as tools for the organization of thinking and the explanation of complex patterns of interaction.

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[4]E.S. Quade (ed.), Analysis for Military Decisions (R-387-PR), (Santa Monica, California: The Rand Corporation, 1964), p. 166-167.

WHAT TYPE OF INSTRUCTIONAL ATMOSPHERE WILL BE MAINTAINED?

The instructional atmosphere contemplated for OPERATION PEP will feature individualized consultation, group interaction, lecture-demonstration and small-group practicum sessions. Educators welcome opportunities to interact with other talented and resourceful professionals in non-threatening atmospheres which allow everyone a chance to give as well as receive ideas, stimulate as well as be stimulated, and teach as well as learn. The instructional environment of OPERATION PEP has been specifically designed to afford each participant many such opportunities. This management training program features:

1. Instruction in the use of a system approach to educational planning and management.

2. Involvement in thinking about concepts, planning new problem-solving approaches and designing new programs.

3. Identification with other key California educators having common interests and concerns.

4. Innovation through "intellectual action" in group situations leading to creative solution-oriented outputs for self-identified problems.

The instructional atmosphere of OPERATION PEP must facilitate the development of an instructional design task force consisting of representative participants, OPERATION PEP staff members and professional consultants.

Planning for task force participation is a difficult chore. Hilgard has stressed that collaboration:

> "...must be on long-range investigations, in which the search is conducted together. We do not know the best specifications for team research, but a variety of skill and experiences have to be brought together among people

who understand each other as they face a common task."[5]

Eckman has stressed the need for collaboration by revealing that:

> "The systems analyst is not a know-all, see-all, hear-all omnipotent but rather a legitimate expert in the methodology and techniques applicable to the study of complex systems. Hence it is concluded that every worthwhile and purposeful systems analysis must be accomplished by more than one person. Call this group a team if you like, but regardless of whether the team interplay is formalized or not, the interchange is a necessary activity."[6]

The foregoing quotations stress the need for establishing and maintaining a conducive atmosphere for task force interaction. The formal design considerations have been prepared to assure continuous participant involvement.

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[5]Earnest R. Hilgard, "A perspective on the Relationship Between Learning Theory and Educational Practice," Theories of Learning and Instruction, Sixty-third Yearbook of the National Society for the Study of Education, Part I (Chicago: The Society, 1964), p. 404.

[6]Eckman, Ibid., p. x.

WHAT ARE THE BASIC FEATURES IN THE INSTRUCTIONAL STRATEGY?

The instructional program of OPERATION PEP is based upon a strategy featuring five models. These models are:

1. A Generic Problem-Solving Model
2. A Model of A System Approach to Problem-Solving
3. A Generic Management Model
4. A Model of Performance Influence
5. A Generic Model to Produce Valid Programs of Planned Change

Each of these models will be discussed in turn.

A Generic Problem-Solving Model

The Generic Problem-Solving Model depicts an ordered profile of functions which, if followed, would cause the user to:

1. Identify a problem.
2. Analyze the problem and its context.
3. Define the problem.
4. Establish goals relative to the problem.
5. Develop a strategy to resolve the problem.
6. Implement strategies to resolve the problem.
7. Evaluate performance to determine whether or not the problem has been resolved.

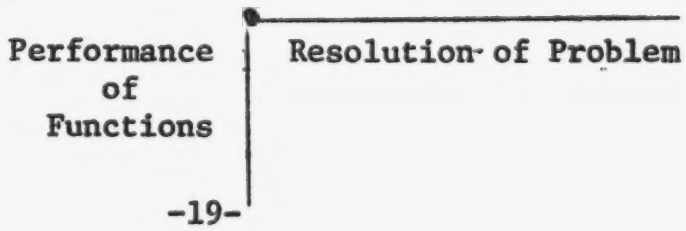
A functional flow block diagram has been used in constructing the model in order that the viewer can study relationships and interaction between functions. Thus, it is possible for each function to be studied independently or in interaction within the total pattern of existing relationships. The functions are

ordered and numbered sequentially using a Dewey Decimal System of notation.

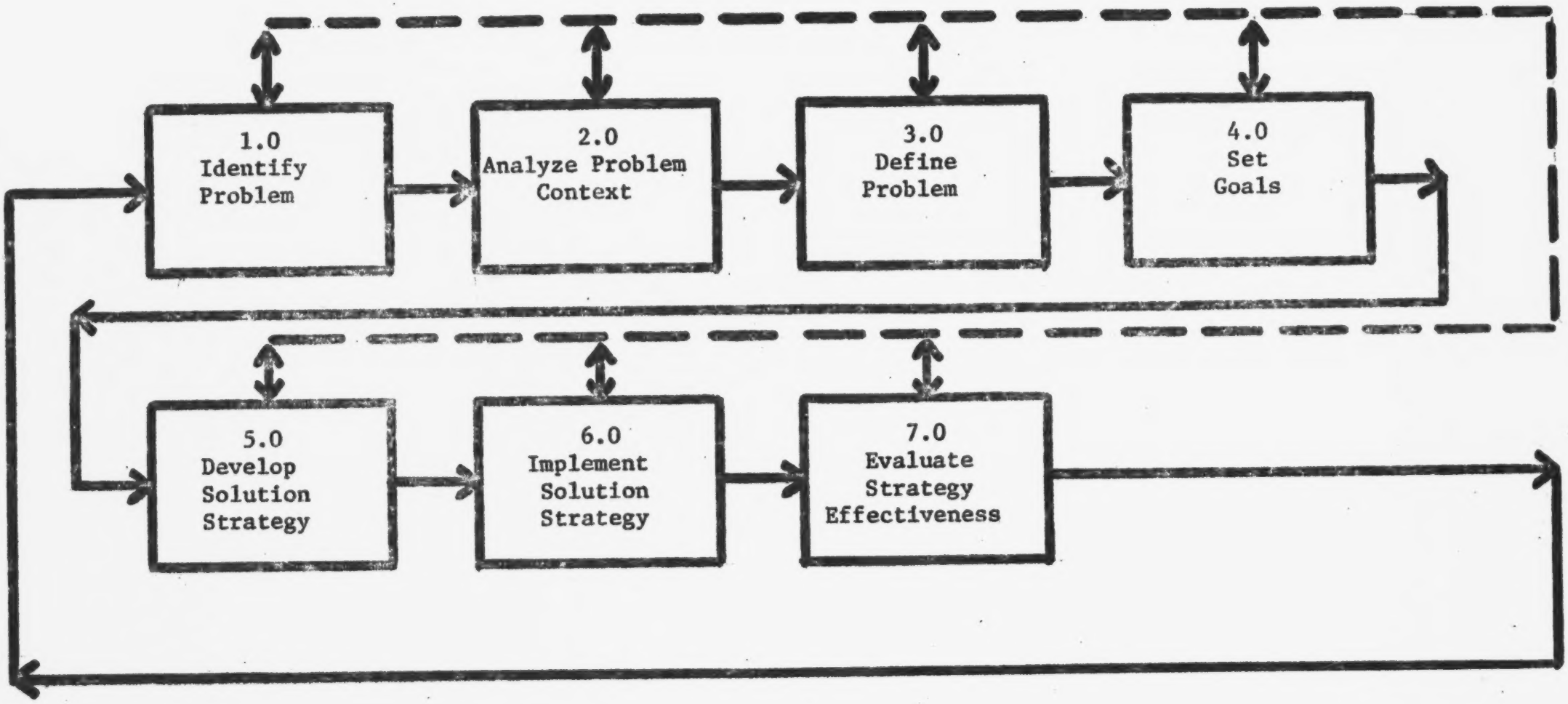
The next critical step is to make sure that each step contains only one function and that each function is expressed simply and clearly using a minimum of terms. The expression of a function must include three elements: (1) an action term denoting the action to be taken; (2) a modifier of the action to be taken; and (3) an object of the action to be taken.

The solid lines of the model depict sequential and/or concurrent flow of performance while the dotted lines depict feed-back and iteration processes. The arrows used with both types of lines indicate flow, relationships and interaction. The lines should always depict a closed-loop pattern of relationships.

Each of the functions depicted in the profile can be developed into a set of lower order functions. These can be ordered into strategies which can be arranged and depicted under the appropriate function in the profile. Thus, as the viewer proceeds from left to right on the profile he can study an ordered plan for the resolution of a problem. When the viewer studies the vertical dimensions, he can see how each function will be performed in terms of an ordered set of sub-functions. The vertical and horizontal functions are related and, therefore, solid and dotted lines of relationship, flow, feed-back and iteration must be used to create a closed-loop model.



A GENERIC PROBLEM
SOLVING MODEL



A Model of a System Approach to Problem-Solving

A Model of a System Approach to Problem-Solving is an expansion of the generic problem-solving model presented in the previous section. The circular format used in the presentation emphasizes the fact that the process is continuous and that solving one problem may produce changes which may present additional problems.

Since the feedback of information and the control of performance are at the center of the management function, these subfunctions have been emphasized. The model depicts a problem-solving strategy consisting of nine steps. Each step contains more than one function and thus each should be functionally analyzed by the user in terms of his problem and performance context.

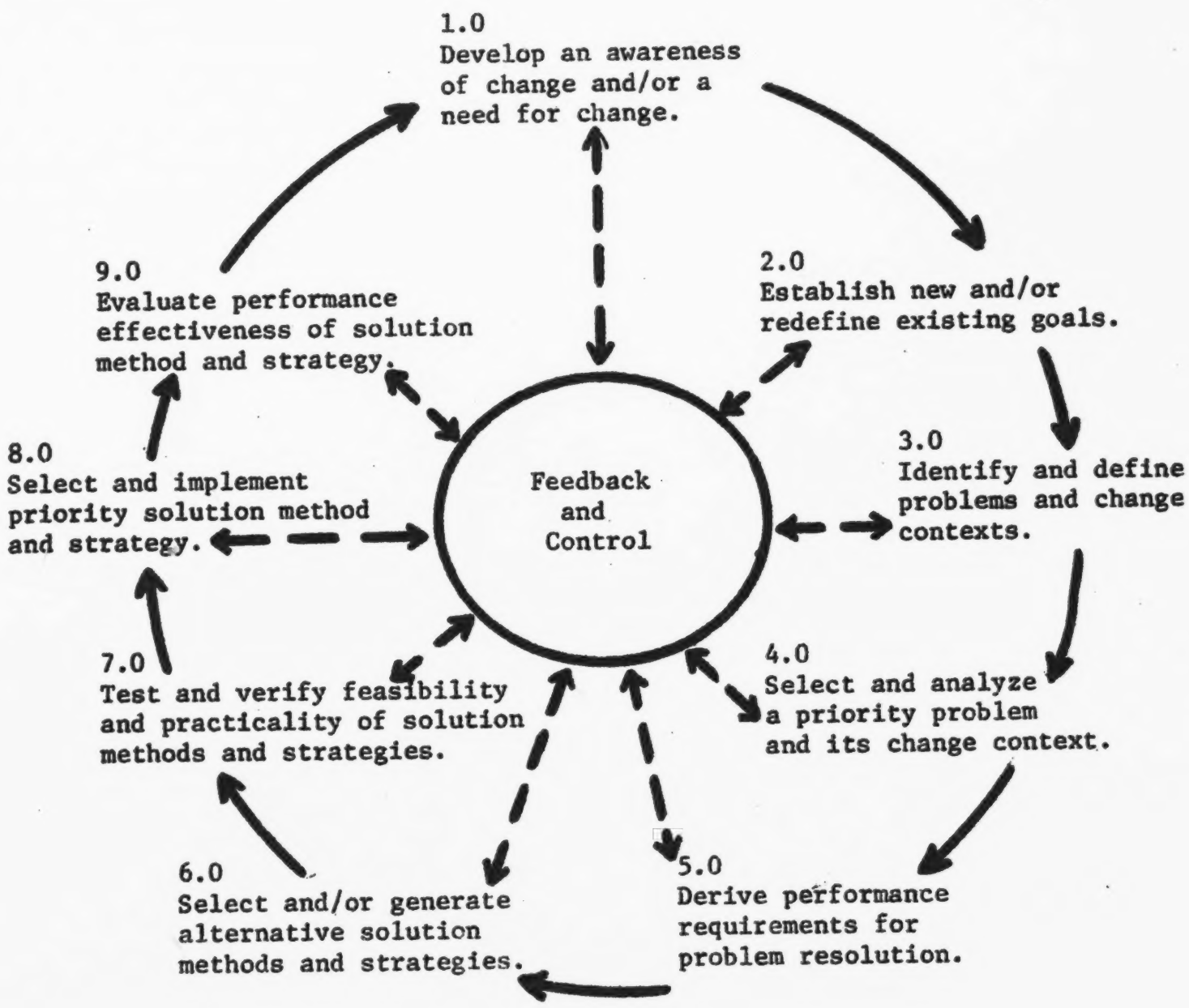
The model can be used in any performance system as a sequential procedure for solving problems. When the model is used with a generic management model, the management model provides a contextual referrent for its application.

A Generic Management Model

A Generic Management Model is a general referrent which can be used to assess management performance in relation to environmental and system performance. The model can be used as an optimal strategy to achieve desired performance products in terms of defined performance requirements and specifications.

Management is a scientific operation designed to plan, coordinate, direct, control, organize and allocate resources in

A MODEL OF A SYSTEM APPROACH TO PROBLEM SOLVING


1.0
Develop an awareness of change and/or a need for change.
2.0
Establish new and/or redefine existing goals.
3.0
Identify and define problems and change contexts.
4.0
Select and analyze a priority problem and its change context.
5.0
Derive performance requirements for problem resolution.
6.0
Select and/or generate alternative solution methods and strategies.
7.0
Test and verify feasibility and practicality of solution methods and strategies.
8.0
Select and implement priority solution method and strategy.
9.0
Evaluate performance effectiveness of solution method and strategy.
Feedback and Control

An examination of the model reveals that:

- the model is a "closed-loop" logic system.
- evaluation data "feeds-back" to every step to facilitate continuous revision and analysis of products.
- an iteration loop exists between each component of the system and every other component facilitating "check-back", feed-back, and verification procedures.

terms of performance requirements within the scope of basic policies established and the pattern of authority delegated by the policy-making structure of the system. Management performs an adaptive function by planning and controlling changes in the actions, patterns and structures of the system.

The user must realize that each component will suggest management functions when it is related to a specific context. These functions can be used to construct functional flow block diagrams depicting plans of action relative to that context. A system approach to problem-solving will facilitate the resolution of specific problems.

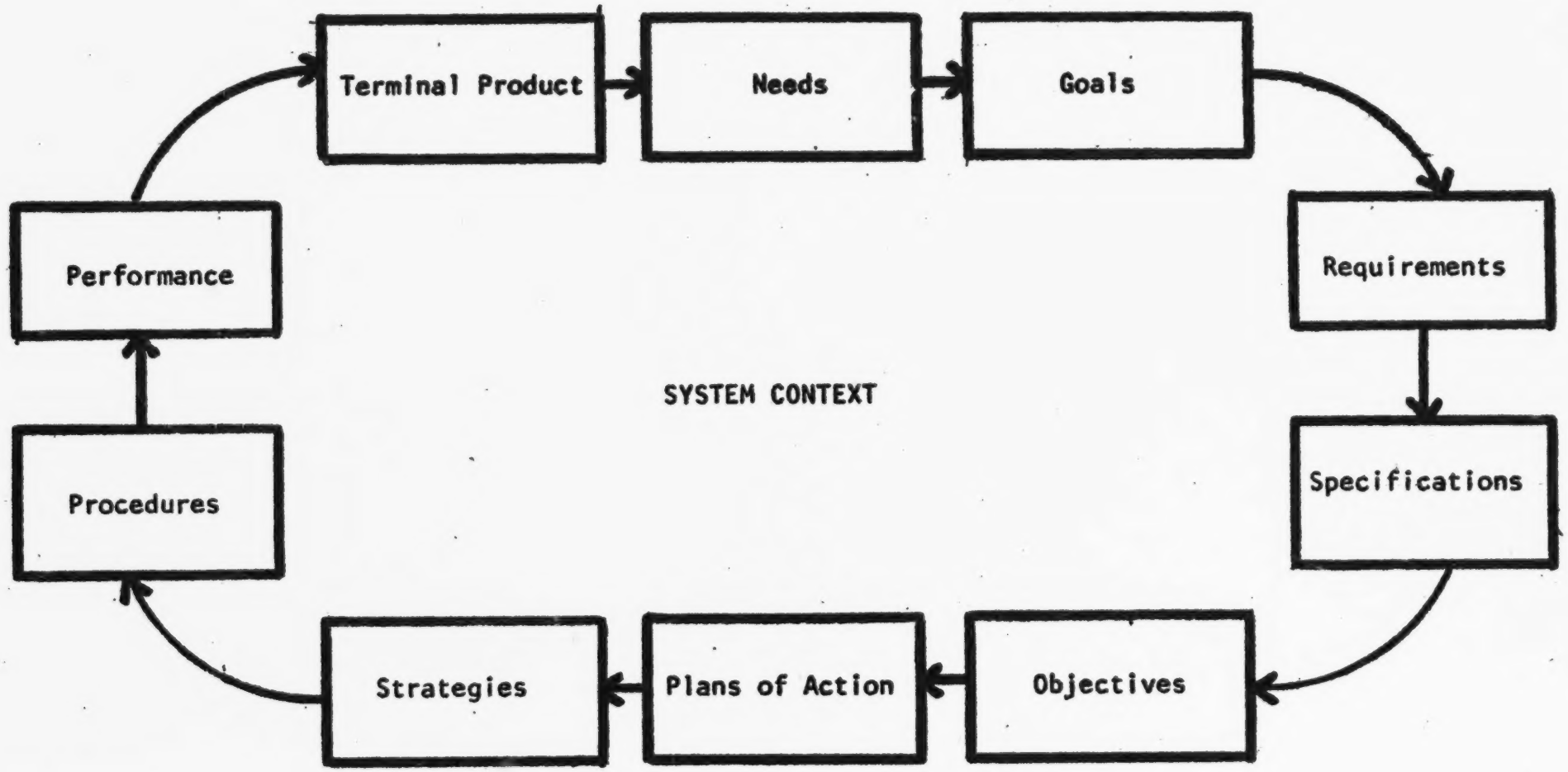
A Model of Performance Influence

The management function of system performance can be related to the system-environment pattern of relationships. A scientific manager works hard to maintain an effective interface between the system and its environment and between the individual components of the system.

A dynamic system is characterized by its capacity to produce, change and/or modify its performance in relation to changing environmental and/or system requirements. Thus, the management performance exists in a sphere of influence which can be analyzed as two hemispheres (see Model of Performance Influence).

The environmental hemisphere of influence is centered upon the continuous influence exerted by the policy-making structure. The policy-making structure establishes performance requirements which can be related to defined performance products. The

A GENERIC MANAGEMENT MODEL



policy-making structure also reacts to the quality and quantity of system performance products.

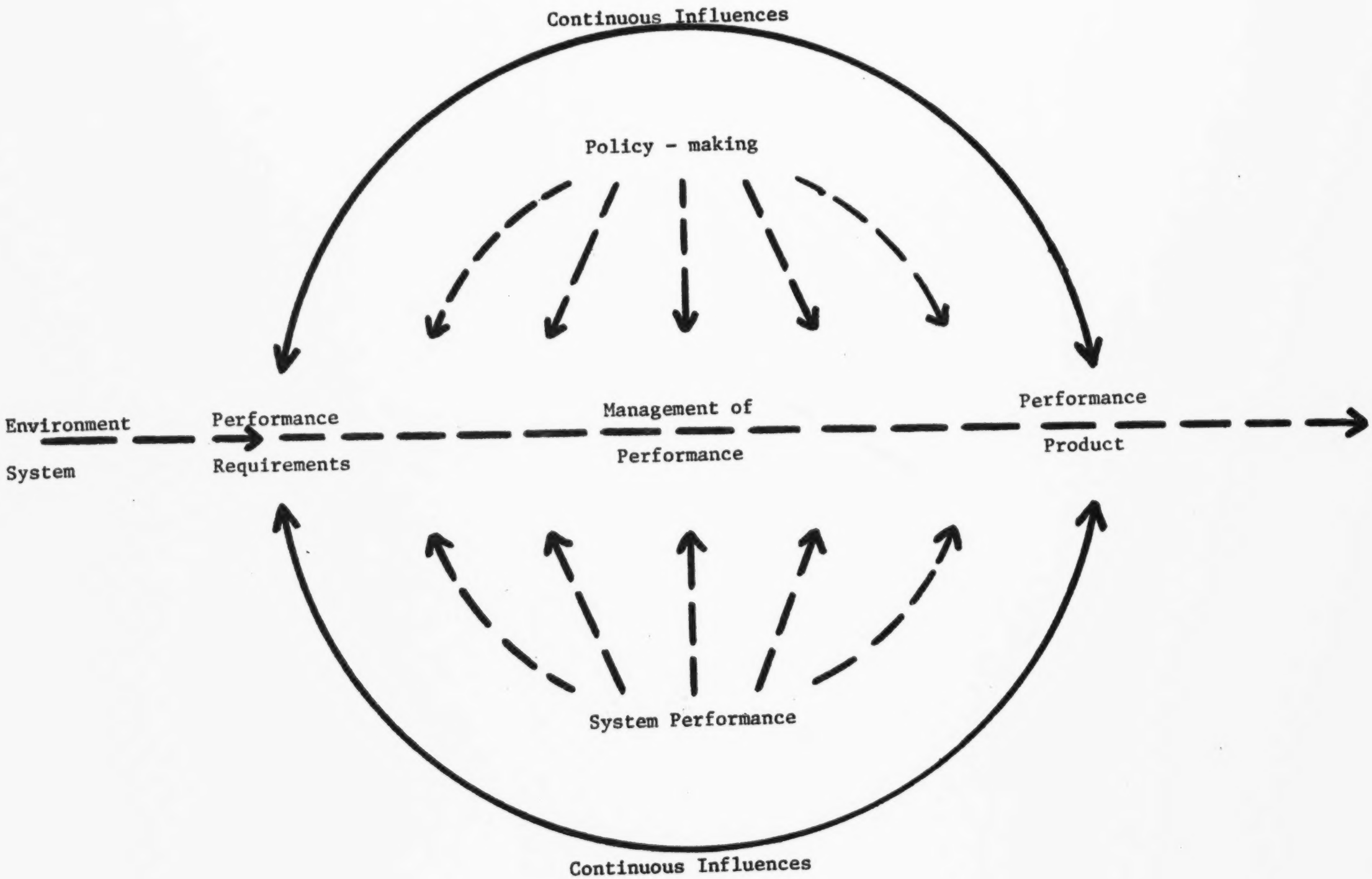
The system hemisphere of influence centers upon the administrative and operational aspects of system performance. Thus, management is receiving continuous influence relative to the development of performance products. Management is required to maintain quality assurance procedures in order that system performance will be efficient and effective in terms of performance requirements.

A Generic Model to Produce Valid Programs of Planned Change

During the course of the 1967-68 program year, the participants in OPERATION PEP will be asked to assist in the development of a generic model which can be used to produce programs of planned change. This model will be developed from a basic design being prepared by OPERATION PEP consultants and staff members.

The model requires an integration of the performance capabilities of a multi-interdisciplinary task force in order that it will produce valid programs. The integration requires interaction between the practical, technical and theoretical domains. Only through this interaction will it be possible for the model to produce valid results.

A MODEL OF PERFORMANCE INFLUENCE



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